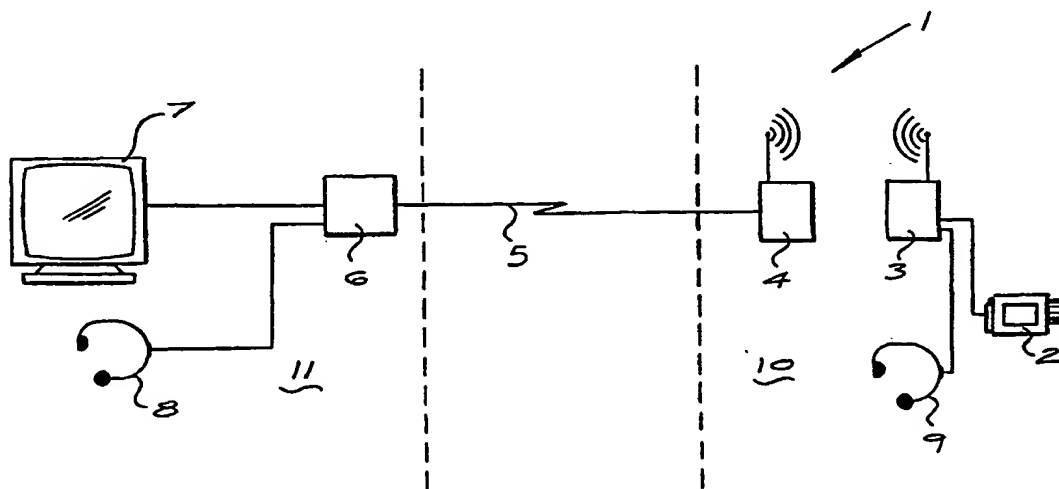




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : H04M 11/04, 11/00, G08B 15/00, H04N 5/232, 7/18	A1	(11) International Publication Number: WO 00/21269 (43) International Publication Date: 13 April 2000 (13.04.00)
(21) International Application Number: PCT/ZA99/00106 (22) International Filing Date: 5 October 1999 (05.10.99) (30) Priority Data: 98/9041 5 October 1998 (05.10.98) ZA (71)(72) Applicant and Inventor: COHEN, Lance, Farrel [ZA/ZA]; 1 Holly Hock Road, Benmore Gardens Ext 3, Sandton, 2196 Gauteng Province (ZA). (74) Agent: JOHN AND KERNICK; P.O. Box 3511, 1685 Halfway House (ZA).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: CAMERA SYSTEM REMOTELY CONTROLLED OVER A COMMUNICATION NETWORK

**(57) Abstract**

This invention relates to a communication system and more particularly, but not exclusively, to a visual and audio communication system. The communication system consists of a video camera which is connected to a portable wireless transceiver. An image from the video camera is transmitted from the wireless transceiver to a signal repeater from where the video signal is transmitted over a telephony communication system to a second transceiver. The second transceiver is arranged to display the video signal on a display means. A first control device is connected to the second transceiver for transmitting a control signal over the telephony communication system to the signal repeater and from the signal repeater to the portable wireless transceiver and to a second control device connected to the portable transceiver for controlling the video camera or an operator of the video camera. The classification is H04N, H04M, H04L.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LJ	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

CAMERA SYSTEM REMOTELY CONTROLLED OVER A COMMUNICATION NETWORK

- 1 -

COMMUNICATION SYSTEM

FIELD OF THE INVENTION

This invention relates to a communication system and more particularly, but not exclusively, to a visual and audio communication system.

BACKGROUND TO THE INVENTION

It is often necessary to inspect a site such as a building site, a factory, or any other dwelling.

- 5 Where such a site is located at a remote location, on-site inspections can be very time consuming and expensive.

OBJECT OF THE INVENTION

It is the object of this invention to provide a communication system which, at least partially, alleviates some of the abovementioned difficulties.

SUMMARY OF THE INVENTION

In accordance with this invention there is provided a communication system comprising a video camera connectable to a portable wireless transceiver for transmitting a video signal from the video camera to a signal repeater from where the video signal is transmitted over a communication system to a second transceiver arranged to display the video signal on a display means, and a first control device connectable to the second transceiver for transmitting a control signal over the telephony communication system to the signal repeater and from the signal repeater to the portable wireless transceiver and to a second control device connected to the portable transceiver.

A further feature of the invention provides for the communication system to be a telephony communication system.

There is further provided for the first and second control devices to be audio communication devices.

There is alternatively provided for the first control device to electronically control the video camera and to at least control the azimuth and elevation of the video camera.

A still further feature of the invention provides for the signal repeater to be located in an aeroplane for relaying video and/or control signals between a remote site and a base station.

A further feature of the invention provides for the first audio communication device to be a microphone and for the second audio communication device to be a loudspeaker or vice versa; alternatively, for both the first and second communication devices to have a microphone and a loudspeaker each to allow for two way audio communication.

There is provided for the telephony communication system to be land based telephone lines; alternatively, for the telephony communications system to be a cellular telephony communication system; further alternatively for the telephony communication device to be a satellite telephony system.

There is further provided for the microphone of the second communication device to be a microphone of the video camera.

This invention extends to a method of inspecting a remote site comprising the steps of connecting a video camera and at least a loudspeaker to a portable wireless transceiver, connecting a signal repeater at a remote site to a telephony communication system, connecting a second transceiver at a base station to the telephony communication system, connecting a display means to the transceiver and connecting a microphone to the second transceiver, displaying a video signal from the video camera at the remote site on the display means and transmitting a control signal from the first control device to the second control device.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention is described below by way of example only and with reference to the accompanying drawings in which :

Figure 1 shows a schematic representation of a first embodiment of a communication system; and

Figure 2 shows a schematic representation of a second embodiment of a communication system.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

With reference to the drawings, in which like numerals refer to like features, a communication system is generally indicated by reference numeral (1).

The communication system consists of a video camera (2), a first and second control devices (8) and (9), a portable wireless transceiver (3), a signal repeater (4), a telephony communication system (5), a second transceiver (6) and a display means (7).

In this embodiment the display means (7) is a computer screen. The first and second control devices (8) and (9) are audio communication devices which consists of headsets with a microphone each and each having a loudspeaker.

The video camera (2) and second audio communication device or second headset (9) is connected to the portable wireless transceiver (3) for use at a remote location (10).

The signal repeater (4) is connected to the telephony communication system (5) at the remote location (10).

5 The second transceiver (6) is connected at a base station (11) to the telephony communication system (5) to allow for communication between the remote location (10) and the base station (11).

The first audio communication device or first headset (8) and the display means (7) is connected to the second transceiver (6).

10 In use, the video camera (2) transmits a video signal to the portable wireless transceiver (3) which then transmits the video signal to the signal repeater (4). The signal repeater (4) receives the video signal and transmits it over the telephony communication system (5) to the second transceiver (6). The second transceiver (6) now causes the video signal to be displayed on the computer screen (7).

15 A voice signal is also transmitted from the first headset (8) to the second transceiver (6) which then transmits the voice signal over the telephony communication system (5) to the signal repeater (4). From the signal repeater (4), the voice signal is transmitted to the portable wireless receiver (3) and to the second headset (9).

20 In this way a camera operator at the remote location (10) can transmit video images of the remote location (10) to the base station (11). A person at the base station (11) can transmit verbal instructions to the camera operator at the remote location (10). Any remote location can thus be inspected by a person at a base station. This obviates the need for such a person to be physically present at the remote location to conduct an inspection.

25 A two way voice communication link can also be established between the camera operator and the person at the base station (11). In this case a voice signal can also be transmitted from the second headset (9) to the first headset (8) through the communication system (1). It will be appreciated that only a one way voice communication link as described above would be necessary to instruct the
30 camera operator.

5 The camera does not have to be operated by a human operator. The camera may be mounted on an adjustable mounting means at a site to be inspected. An electronic control signal from the first control device which may be a computer may then control the view direction, ie panning and tilt, of the camera and other functions of the camera itself. The camera may also be mounted such that the direction in which it points does not have to be changed or cannot be changed. Camera functions only may then be controllable from a base station.

10 The telephony communication system used may be based on land telephone lines, cellular telephone systems or satellite telephone systems as is known in the art.

While the camera (2) transmits images to the base station (11), the same images may be recorded on a video cassette inserted in the camera. A camera using a digital video disk or the like may also be used.

15 Figure 2 shows a second embodiment of a communication system. In this embodiment, a second portable display means (12) is connected to the first transceiver (3).

20 A wireless connection is established between the second transceiver (6) and a third transceiver (13). The display means (7) and the second control device (8) are now connected to the third transceiver (13). In this embodiment, the display means (7) is a portable display means. A second video camera (14) is also connected to the third transceiver (13). The communication system shown in figure 2, in effect replaces the components of the base station (11) of figure 1 with the components of the remote location (10) of figure 1. The display means (7) is now portable and a similar portable display means is connected to the first transceiver (3) of the remote location (10) of figure 1.

25 The remote location (10) and base station (11) are no longer clearly distinguishable and any end of the communication system of figure 2 can act as either a base station or a remote location. A operator at one end can view what the operator at the other end is filming and vice versa.

30 Other non-portable display means (15) can be connected as shown to show images being shot by any one of the video cameras. Recording means (16) may also be used to record images and/or control signals and/or voice signals on magnetic tape or on any other convenient recording media.

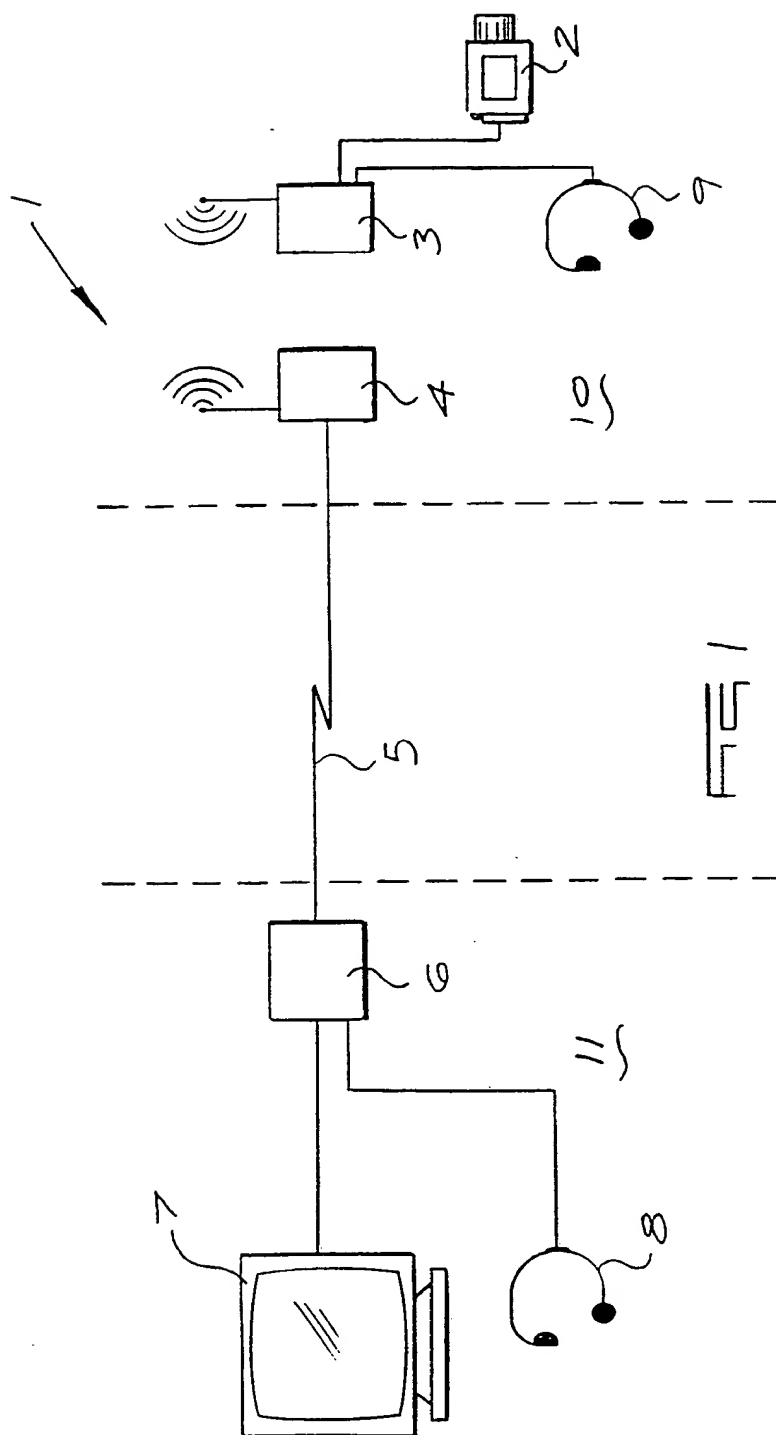
As shown in figure 2, a series of first (3) and third (13) transceivers each having a camera (2) and (14), a portable display (12) and (7) and a headset (9) and (8) connected thereto, are employed.

- 5 Other electronic control means may replace the headsets (9) and (8) to electronically control azimuth and elevation of a camera, zoom function of a camera or any other controllable function of a camera.

CLAIMS

1. A communication system comprising a video camera connectable to a portable wireless transceiver for transmitting a video signal from the video camera to a signal repeater, from which the video signal is transmitted over a telephony communication system to a second transceiver arranged to receive the video signal and to display it on a display means, and a first control device connectable to the second transceiver for transmitting a control signal over the telephony communication system to the signal repeater and from the signal repeater to the portable wireless transceiver and to a second control device connected to the portable transceiver.
2. A communication system as claimed is claim 1 in which the video camera is electronically controllable by the first control device.
3. A communication system as claimed in any one of the preceding claims in which azimuth and elevation of the video camera are electronically controllable by the first control device.
4. A communication system as claimed in claim 1 in which the first and second control devices are audio communication devices.
5. A communication system as claimed in claim 4 in which the audio communication devices provide at least a one way voice communication link from the first control device to the second control device.
6. A communication system as claimed in any one of the claims 4 or 5 in which at least the second control device includes a headset having a loudspeaker.

- 5 7. A method of inspecting a remote site with a communication system comprising the steps of connecting a video camera and a second control device to a portable wireless transceiver at the remote site, connecting a signal repeater at the remote site to a telephony communication system, connecting a second transceiver at a base station to the telephony communication system, connecting a display means to the second transceiver and connecting a first control device to the second transceiver, displaying a video signal from the video camera at the remote site on the display means and the transmitting a control signal from the first control device over the telephony communication system to the signal repeater and to the second control device connected to the wireless transceiver.
- 10
8. The method as claimed in claim 7 in which the first and second control devices are used to electronically control the video camera.
- 15 9. The method as claimed in claim 7 in which the first and second control devices are audio communication devices.



THIS PAGE BLANK (USPTO)

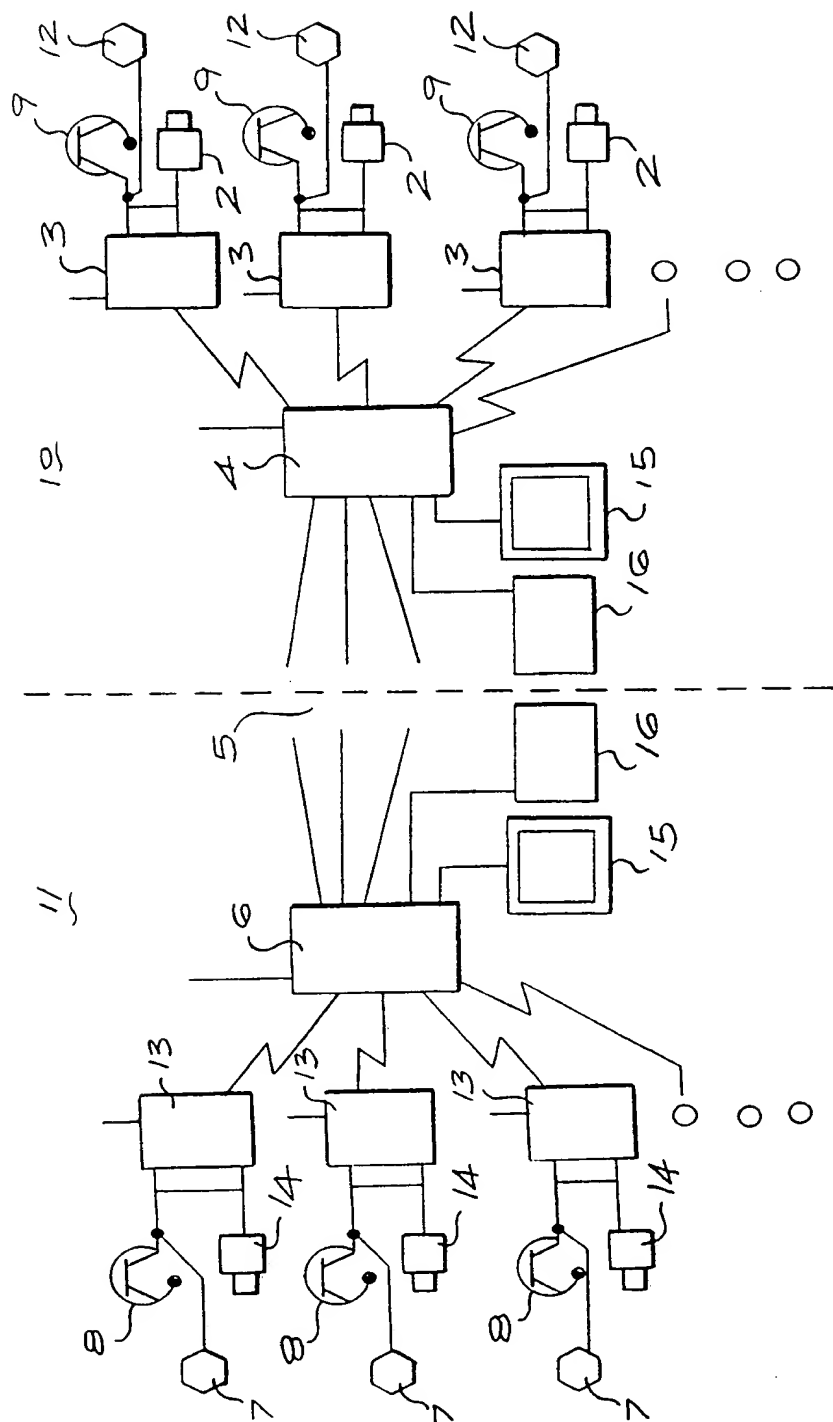


FIG. 2

THIS PAGE BLANK (USP10)

INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 99/00106

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04M11/04 H04M11/00 G08B15/00 H04N5/232 H04N7/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N G08B H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 256 771 A (CABLE SRL) 16 December 1992 (1992-12-16)	1,7
Y	page 1, line 4 - line 20 page 4, line 2 -page 10, line 15 ----	2-6,8,9
Y	US 4 954 886 A (ELBERBAUM DAVID) 4 September 1990 (1990-09-04) column 3, line 32 - line 50 column 6, line 65 -column 7, line 10 column 8, line 28 - line 49 ----	2,3,8
Y	US 4 326 221 A (MALLOS GENE G ET AL) 20 April 1982 (1982-04-20) column 1, line 12 - line 34 column 1, line 47 -column 9, line 14 -----	4-6,9

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

28 January 2000

Date of mailing of the international search report

17/02/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Karavassilis, N

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/ZA 99/00106

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2256771 A	16-12-1992	IT 1249907 B ES 2038930 B FR 2677833 A	30-03-1995 16-02-1997 18-12-1992
US 4954886 A	04-09-1990	JP 1236873 A	21-09-1989
US 4326221 A	20-04-1982	NONE	